

NEW COMBINATIONS, NEW SYNONYMY, AND HYNONYMY IN THE
ERIOCOCCIDAE, NEW HOMONYMY AND SYNONYMY IN THE
CEROCOCCIDAE, AND TRANSFER OF *CANCEROCOCCUS* KOTEJA TO THE
MARGARODIDAE (HEMIPTERA: COCCOIDEA)

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Abstract.—A database and catalog of the eriococcid and cerococcid scale insects of the world is nearly complete and soon will be in press and placed on the World Wide Web. Before this is done, new combinations and other taxonomic changes need to be validated in print. This publication includes *Neokaweckia* Tang and Hao as a **new synonym** of *Eriococcus*, proposal of *Neotrichococcus* as a **new name** for *Trichococcus* Borchsenius, and new combinations in the family Eriococcidae; a new homonym and synonym in the Cerococcidae; and transfer of *Cancerococcus* from Eriococcidae to Margarodidae.

Key Words: felt scales, Coccoidea, Eriococcidae, Cerococcidae, Margarodidae, ScaleNet, catalog, new combinations, Internet

We currently are finishing a database and manuscript on the Eriococcidae and Cerococcidae of the world. This research is part of a larger project called "ScaleNet" to develop a systematic database of the Coccoidea of the World; see Miller and Gimpel (1996), and Ben-Dov et al. (1997). One of the most controversial subjects in synthesizing the systematic data on eriococcids is to make sense out of the genera *Acanthococcus* Signoret, *Anophococcus* Balachowsky, *Eriococcus* Targioni Tozzetti, *Gossyparia* Signoret, *Greenisca* Borchsenius, *Gregoporia* Danzig, *Kaweckia* Koteja and Zak-Ogaza, *Neokaweckia* Tang and Hao, and *Rhizococcus* Signoret. Most European literature recognizes all, or nearly all, of these genera as distinct, e.g., Kosztarab and Kozár (1988), but Hoy (1963) treated many of them as junior synonyms of *Eriococcus* and Williams (1985) treated all but *Gregoporia* as members of *Eriococcus*. *Gre-*

goporia was first treated as a synonym by Miller and Gimpel (1996) and *Neokaweckia* is here considered as a new junior synonym of *Eriococcus*.

Although some have criticized the lumping of these genera as a reversion to Linnaean times (Koteja 1997), we believe that the characters used to define these genera are homoplasious and discriminate artificial groups. It is logical to assume that natural groups occur in this assemblage, but it is important to undertake a careful phylogenetic analysis to discover the groupings. Some cladistic work using molecular and morphological character systems is underway in this regard by P. J. Gullan and Lyn Cook (Division of Botany and Zoology, Australian National University, Canberra). Their preliminary findings have been quite interesting and suggest the strong possibility that there will be several genera within what is here treated as *Eriococcus* (Gullan,

personal communication June 17, 1998). Unfortunately, this important research has been underway for only a short period of time and currently includes a small sample of the world eriococcid fauna.

For many years, the first author surmised that the unusually large tubular ducts present on *E. buxi* (Fonscolombe) and *E. eucalypti* Maskell were sufficient to characterize *Eriococcus* as separate from *Acanthococcus* (see Miller and Williams 1976). However, it now appears that this is not necessarily the case and for the purposes of this paper we accept the conservative view pending results of the research by Gullan and her colleagues. This conservative view is consistent with the research of Ferris (1957), Hoy (1963), and Williams (1985) and places all or most of the questionable genera in the genus *Eriococcus*. With this in mind, it is necessary to move several species previously placed in *Acanthococcus* into the genus *Eriococcus* for the first time.

NEW COMBINATIONS IN THE ERIOCOCCIDAE

Eriococcus abaii (Danzig), **n. comb.**

Acanthococcus abaii Danzig 1990: 373.

Eriococcus actius (Miller & Miller), **n. comb.**

Acanthococcus actius Miller & Miller 1993: 9.

Eriococcus adzhariensis (Hadzibejli), **n. comb.**

Acanthococcus adzhariensis Hadzibejli 1960: 310.

Eriococcus arenariae (Miller & Miller), **n. comb.**

Acanthococcus arenariae Miller & Miller 1993: 13.

Eriococcus barri (Miller), **n. comb.**

Acanthococcus barri Miller 1991: 337.

Eriococcus beshearae (Miller & Miller), **n. comb.**

Acanthococcus beshearae Miller & Miller 1993: 15.

Eriococcus brachypodii (Borchsenius & Danzig), **n. comb.**

Greenisca brachypodii Borchsenius & Danzig 1966: 43.

Eriococcus centaureae (Savescu), **n. comb.**
Acanthococcus centaureae Savescu 1985: 122.

Eriococcus danzigae (Miller & Gimpel), **n. comb.**

Rhizococcus confusus Danzig 1962a: 854 (junior secondary homonym).

Acanthococcus danzigae Miller & Gimpel 1996: 600 (replacement name).

Remarks: The replacement name *A. danzigae* was given for *Rhizococcus confusus* Danzig (1962a) when it was transferred to *Acanthococcus* by Miller & Gimpel (1996) making it a junior secondary homonym of *A. confusus* (Maskell) (1892). The species epithet *danzigae* must continue to be used when transferred to *Eriococcus*, since *A. confusus* (Maskell) also is placed in *Eriococcus* and is the senior homonym.

Eriococcus davidsoni (Miller & Miller), **n. comb.**

Acanthococcus davidsoni Miller & Miller 1993: 25.

Eriococcus dennoi (Miller & Miller), **n. comb.**

Acanthococcus dennoi Miller & Miller 1993: 27.

Eriococcus droserae (Miller, Liu, and Howell), **n. comb.**

Acanthococcus droserae Miller, Liu, and Howell 1992: 512.

Eriococcus epacrotrichus (Miller & Miller), **n. comb.**

Acanthococcus epacrotrichus Miller & Miller 1992: 33.

Eriococcus evelinae (Kozár), **n. comb.**

Rhizococcus evelinae Kozár 1983: 144.

Acanthococcus evelinae (Kozár); Miller & Gimpel 1996: 600.

Eriococcus froebeae (Miller), **n. comb.**

Acanthococcus froebeae Miller 1991: 343.

Eriococcus herbaceus (Danzig), **n. comb.**

- Rhizococcus herbaceus* Danzig 1962b: 22.
Acanthococcus herbaceus; Nast et al. 1990: 120.
Acanthococcus herbaceus; Tereznikova 1981: 29.
- Eriococcus hoyi* (Miller & Miller), **n. comb.**
Acanthococcus hoyi Miller & Miller 1992: 44.
- Eriococcus iljiniae* (Danzig), **n. comb.**
Rhizococcus iljiniae Danzig 1972: 339.
Acanthococcus iljiniae; Miller & Gimpel 1996: 601.
- Eriococcus istriensis* (Kozár), **n. comb.**
Gregoporia istriensis Kozár 1983: 142.
Acanthococcus istriensis; Miller & Gimpel 1996: 601.
- Eriococcus korotyaevi* (Danzig), **n. comb.**
Acanthococcus korotyaevi Danzig 1982: 145.
- Eriococcus laeticoris* (Tereznikova), **n. comb.**
Greenisca laeticoris Tereznikova 1965: 975.
Kaweckia laeticoris; Koteja & Zak-Ogaza 1981: 507.
Neokaweckia laeticoris; Tang & Hao 1995: 514.
Acanthococcus laeticoris; Miller & Gimpel 1996: 601.
- Eriococcus leptoporus* (Miller & Miller), **n. comb.**
Acanthococcus leptoporus Miller & Miller 1993: 39.
- Eriococcus mackenziei* (Miller & Miller), **n. comb.**
Acanthococcus mackenziei Miller & Miller 1992: 60.
- Eriococcus macrobactrus* (Miller & Miller), **n. comb.**
Acanthococcus macrobactrus Miller & Miller 1992: 62.
- Eriococcus matesovae* (Miller & Gimpel), **n. comb.**
Acanthococcus multispinosus Matesova 1976: 24 (junior secondary homonym).
- Acanthococcus matesovae* Miller & Gimpel 1996: 600 (replacement name).
- Remarks: The replacement name *A. matesovae* was given for *Acanthococcus multispinosus* Matesova (1976) when it was transferred to *Acanthococcus* by Miller & Gimpel (1996) making it a junior secondary homonym of *A. multispinosus* Kuhlgtz (1898). The species epithet *matesovae* must continue to be used when transferred to *Eriococcus*, since *A. multispinosus* Kulgtz also is placed in *Eriococcus* and is the senior homonym.
- Eriococcus megaporus* (Miller & Miller), **n. comb.**
Acanthococcus megaporus Miller & Miller 1993: 45.
- Eriococcus mesotrichus* (Miller & Miller), **n. comb.**
Acanthococcus mesotrichus Miller & Miller 1993: 48.
- Eriococcus microtrichus* (Miller & Miller), **n. comb.**
Acanthococcus microtrichus Miller & Miller 1992: 65.
- Eriococcus minimus* (Tang & Li), **n. comb.**
Acanthococcus minimus Tang & Li 1988: 71.
Rhizococcus minimus; Tang & Hao 1995: 352.
- Eriococcus monotrichus* (Miller & Miller), **n. comb.**
Acanthococcus microtrichus Miller & Miller 1993: 54.
- Eriococcus multispinatus* (Tang & Hao), **n. comb.**
Rhizococcus multispinatus Tang & Hao 1995: 598.
Acanthococcus multispinatus; Miller & Gimpel 1996: 602.
- Eriococcus oligacanthus* (Danzig), **n. comb.**
Rhizococcus oligacanthus Danzig 1972: 341.
Acanthococcus oligacanthus; Miller & Gimpel 1996: 602.

Eriococcus oligotrichus (Miller & Miller), **n. comb.**

Acanthococcus oligotrichus Miller & Miller 1993: 57.

Eriococcus ophius (Miller & Miller), **n. comb.**

Acanthococcus ophius Miller & Miller 1993: 59.

Eriococcus orientalis (Borchsenius), **n. comb.**

Greenisca orientalis Borchsenius 1956: 676.

Kaweckia orientalis (Borchsenius); Tang & Hao 1995: 511.

Acanthococcus orientalis (Borchsenius); Miller & Gimpel 1996: 602.

Eriococcus oxyacanthus (Danzig), **n. comb.**

Acanthococcus oxyacanthus Danzig 1975: 55.

Rhizococcus oxyacanthus; Kozár & Walter 1985: 75.

Eriococcus rubrus (Matesova), **n. comb.**

Greenisca rubra Matesova 1960: 209.

Kaweckia rubra; Koteja & Zak-Ogaza 1981: 508.

Neokaweckia rubra; Tang & Hao 1995: 515.

Acanthococcus rubra; Miller & Gimpel 1996: 603.

Eriococcus salicicola Tang, **nomen nudum**

Remarks: Tang (1984) indicated that this species occurs widely over northeastern China on willow. He stated that he would be describing the species as new in the future, but there is no record of its publication.

Eriococcus stauroporus (Miller & Miller), **n. comb.**

Acanthococcus stauroporus Miller & Miller 1992: 82.

Eriococcus tosotrichus (Miller & Miller), **n. comb.**

Acanthococcus tosotrichus Miller & Miller 1993: 62.

Eriococcus washingtonensis (Miller & Miller), **n. comb.**

Acanthococcus washingtonensis Miller & Miller 1992: 90.

Eriococcus whiteheadi (Miller), **n. comb.**

Acanthococcus whiteheadi Miller 1991: 350.

Eriococcus zernae (Tereznikova), **n. comb.**

Acanthococcus zernae Tereznikova 1977: 571.

NEW GENERIC SYNONYMY IN THE ERIOCOCCIDAE

Neokaweckia Tang & Hao 1995: 596, **new synonymy**

Type species: *Greenisca rubra* Matesova 1960, by monotypy and original designation

Remarks: This genus is characterized by having a small anal ring, truncate body setae that are restricted to the last abdominal segments, and dorsal cruciform pores. These characters are considered to be within the expected range of variation for the genus *Eriococcus*.

NEW GENERIC HOMONYMY AND REPLACEMENT NAME IN THE ERIOCOCCIDAE

Neotrichococcus Miller & Gimpel, **new replacement name**

Trichococcus Borchsenius 1948: 503.

Type species: *Trichococcus filifer* Borchsenius 1948, by monotypy and original designation.

Remarks: *Trichococcus* Borchsenius is a junior homonym of *Trichococcus* Kanda (1941) which is now considered to be a junior synonym of *Beesonia* Green. Morrison and Morrison (1966) first discovered this homonymy but did not provide a replacement name.

Neotrichococcus filifer (Borchsenius), **n. comb.**

Trichococcus filifer Borchsenius 1948: 503.

FAMILY TRANSFER OF CANCEROCOCCUS TO THE MARGARODIDAE

Cancerococcus Koteja 1988: 412, **new family assignment**

Remarks: This monotypic genus was originally placed in the Eriococcidae presumably because of the enlarged setae on the antennae, a character found in many eriococcid males. However, we have discovered that the genus is most closely related to the Pityococcini genera *Pityococcus* (McKenzie 1942) (including the species *P. ferrisi* McKenzie, *P. deleoni* McKenzie, *P. rugulosus* McKenzie) and *Desmococcus* (*D. captivus* McKenzie and *D. sedentarius* McKenzie) and is here transferred to the Margarodidae. The description of *Cancerococcus* (Koteja 1988) is based on a single wingless male from amber. The illustrations and description provided by Koteja were compared with a single undetermined male of *Pityococcus* deposited in the collection of National Museum of Natural History, Beltsville, Maryland. The following similarities occur in both taxa: Numerous short setae on the antennae; penial sheath that is apically bifurcate and has a broad aedeagus; antennae with short, round segments; eyes apparently numbering 4 (*C. apterous*) or 5 (*Pityococcus* sp.) on each side of the head and set on a plate. This combination of characters is unique to the Pityococcini in the Margarodidae.

NEW SYNONYMY IN THE CEROCOCCIDAE

Asterococcus ramakrishnai (Ramakrishna Ayyar)

Cerococcus ramakrishnae Ramachanran & Ramakrishna Ayyar 1934: 86. (nomen nudum)

Cerococcus ramakrishnae Ramakrishna Ayyar 1936: 148.

Asterococcus ramakrishnai Lambdin 1983: 304–306, **new homonymy and synonymy**.

Remarks: The original combination of *Cerococcus ramakrishnae* is an unpublished manuscript name of Green. Ramachanran & Ramakrishna Ayyar (1934) cited the name but gave no description thus creating a nomen nudum. Ramakrishna Ayyar (1936) did not realize that he was validating

the name and describing it after himself, but this was the case. Lambdin (1983) apparently knew of Green's manuscript name, but did not realize that Ramakrishna's description was valid and described the species as new. Lambdin also corrected the spelling of the species epithet from "*ramakrishnae*" to "*ramakrishnai*" and moved the species from *Cerococcus* to *Asterococcus*. From the syntypes of *Cerococcus ramakrishnae*, we have chosen and marked as lectotype an adult female labeled in Green's handwriting: "on Ficus rootlets/India, (Coimbatore)/ coll. Ramakrishna/ 24/ 31. No. 335." (BMNH). The slide contains three specimens; the center specimen is the lectotype. There are three paralectotypes.

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